WOODS HOLE OCEANOGRAPHIC INSTITUTION
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Report on ATLANTIS Cruise #266

June-July 1961

by

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APPROVED FOR DISTRIBUTION Paul M. Fye

Paul M. Fye, Director

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ABSTRACT

The data collected on ATLANTIS Cruise 266 has been tabulated and presented here as an aid to the preparation of manuscripts. The Chief Scientist's log is reproduced in narrative form. The current meter, camera, and dredge stations, as well as the continuous seismic profiles, are located and deck notes reproduced.

Included are photographs of models of the areas visited.

ACKNOWLEDGMENTS

The cruise would not have been possible without the fine cooperation shown by the ATLANTIS' officers and crew. Thanks are due to the Acoustics Lab for the help in outfitting for the cruise. Dr. Richard M. Pratt ably operated the cameras and spent many uncomfortable hours in the darkroom aboard. To my students, Messrs. P. C. Beamish, D. J. Krotser, C. L. Mc Connell, T. R. Mc Getchin, and J. H. Wakelin, III, my thanks for their labor and interest. In return, they learned something about practical oceanography, I am sure.

Dr. J. B. Hersey has guided this work from its beginning. The Navy's Bureau of Ships Contract NObsr 72521 has generously supported this work.

INTRODUCTION

Since 1954 the Blake Plateau has interested the geophysical group here at Woods Hole. Early cruises gathered data on this region incidental to other work. It became apparent that the area was worthy of more intense study. Questions about the bathymetry and underlying structure had been raised.

This is a report of the most recent cruise undertaken to study the northern portion of the Plateau. It is intended to summarize the data collected and to be useful as an aid to investigators in preparation of manuscripts for publication.

CRUISE NARRATIVE

June-July 1961

20 June Sail from Woods Hole about 1100. Commence echo-sounding (E/S) before reaching Tarpaulin Cove Light.

Scientific Party and E/S Watches:

T. R. Stetson, Chief Scientist	
R. M. Pratt	8-12
P. C. Beamish	12-16
D. J. Krotser	16-20
C. L. Mc Connell	20-24
T. R. Mc Getchin	00-04
J. H. Wakelin	04-08

Vessel heads for a position at 32°00'N, 77°25'W, the so-called Bump Province on the Blake Plateau (see Figure I). First day spent in rigging gear in lab and in giving instruction on Precision Graphic Recorder (PGR) and Loran.

21 June. Instruction continues. Flexidisc hydrophone mounted with "Braincon" fairing,type 107. Edgerton camera prepared. Hudson Canyon passed about 0500. Fire and abandon ship drills about 1330. Continuous trouble in scale-line generator of PGR which seems dependent on temperature, as it disappeares when cooled. Rigged fans.

22 June Progress slow off Hatteras, about 4 kts in a bit of weather. Heavy rain squalls. E/S record (about 1000) shows good scattering layer fluctuating in response to the light. When heavy, dark squalls surround us the layer rises. Scale-line trouble persists in spite of efforts to fix it. Try spare, but it doesn't function at all. By 1330 original scale-line generator was made operative by adjusting various pots. 1415 - saw small sperm whale off starboard side. Several pods of whales sighted throughout afternoon.

23 June Steaming as before, finally pass C. Hatteras about 0400. Weather improves. Rock dredge bags looked too long and so were shortened to 11 rings deep. Installed canvas bag in bottom half in order to retain fine material. Still close to 200 miles to Bump Province. Tested H. Hoskins' "audio mixer" which is supposed to eliminate surface noise. It blew up in a cloud of white smoke. Autopsy confirmed that a condenser had been wired backward and was replaced, but still no luck with this device. Load camera for tomorrow's camera station, if we ever get there. At 1900 we still have about 120 miles to go.

24 June At 0320 passed over ripple marks on the sea floor in 20 fms. which were reflected in the scattering layer. About 0400 still another set of ripple marks but not reflected in scattering layer. 0700 - about 60 miles from Bump Province; Gulf Stream running strong. 1636 - Heave to for Camera Station 1 (see Figure II and Table II). After lowering we weren't sure whether camera was bottomed due to difficulties with PGR record. After film was developed, it appeared camera was just 100 fms. off. Rig 1000 w/s Thumper transducer on E.G.and G. fish under wing tank (filled with foam) for Continuous Seismic Profiler (CSP) work. The transducer hangs about 6 ft. deep below pontoon. This will be towed astern at suitable distance. We will use a receiver in the form of the old thermistor fish rigged with a Flexidisc hydrophone. This fish is BT-sized and was rigged out on a 30 ft. boom from the starboard mizzen shrouds, opposite the hydro winch. Cable to fish has Braincon fairing for first 12 ft. Electronics: Fish into dummy preamp into suitcase amplifier into Allison filters into PGR. A problem develops with getting Thumper to key.

25 June 0310 - We finally gave up attempt to CSP and commence to steam a course to make good 280° to get back on western side of Bump square. Used echo sounder to provide good location for Camera Station 2 in Bump Province. Camera over at 0815. Bottom flattened out on us during this station. Steam north and west for more bumps for Dredge Station 1 (see Figure III). Haul was empty. We let out 964 m. of cable in 684 m. of water. Apparently dredge did not touch bottom. Dredge 2: let out 1800 m. in 803 m. of water. See descriptions of samples in Table III. Notable were 2 shark's teeth. Commence steaming to SW for camera station. Continue work on Thumper keying problem. One may find fault with the sorting of the dredge hauls into biological, coarse and fine geological fractions. The chain bag dredge arrives well sorted at the rail: coarse material on top and fines trapped below in the canvas bag. The biological fraction may be distributed throughout and must be sorted in order to be preserved. In so far as possible, a separate jar is used to store an original sample. Commence Camera Station 3 with same units as on previous stations which were as follows:

1. U/W Camera CA-9 #17
2. U/W Camera CA-9 #24
3. Edo xdcr #34
4. Sonar Pinger SP-9 #11
5. U/W Strobe LS-9 #17

N. B. #5 above flooded at outset of Station 3 and was replaced by LS-9 #15. #4 had broken Joy plug at end of Station 7. Replaced by SP-8 #4, 29 June.

26 June Thumper keying trouble resolved in early morning hours and, after a move to the west, CSP 1 commenced (see Figure IV and Table IV). Ended first profile at 0730; white-tipped shark was nosing around Thumper transducer and hydrophone.

Camera Station 4 began about 1115 but no flash; over again at 1130 for 2 hours. Today at 1600 Krotser and Wakelin exchange watches so that the former can observe the seismic profiler at work; this is where his major interest lies. Dredge (pipe) 3 down 1412. Up at 1449, with hard carbonate mud and broken coral. Correlation with E/S record shows sample was taken in flat area. Had attempted bumps but had passed over them by the time dredge was down. Dredge 4 was another attempt to get bump sample, but not certain. Brought up live coral.

After dredging, experiments were made with Thumper. Rigged old thermistor fish with flexidisc hydrophone from 30' boom on starboard side. Thence into "dummy" preamp into suitcase amplifier into Allisons into PGR. Noise which appeared to be 60 cycle was too great: saw and heard no bottom. We tried recording flat also. Source for these tests was E. G. and G. 1000 w/s Thumper transducer on E. G. and G. fish suspended as before under wingtank. Tried flexidisc into transistorized preamp and amplifier built by D. Wilde into filters and PGR. Gear was tried without filters. Still no signal from bottom, but there was much 60 cycle as gains were raised.

CSP 2 was accomplsihed with an AX-58 in brass fish from boom. Profile could only be made when hove to. Tried various speeds but even slow half (200 rpm) was too noisy. Need at least fast half to stem current. Much screw noise as 'phone tows opposite screw. There seems to be no justification for a boom unless it is mounted as a bowspirit.

27 June Steam across Bump Province to west side for CSP 3 at 0332. Watch ran into trouble keeping 'phone away from ship. Camera Station 5 taken; steaming on wire was not necessary as drift was very slight.

On stations to date the drift has been very erratic. On Dredge 5 we attempted to navigate ship over a feature previously crossed. Drift (wind and current) had been calculated for this area and an estimate of time required to lower the gear was figured in. All was to no avail, partly because of Loran failure at crucial times, but also due to inconstant drift. The dredge probably

sampled a bump on this lowering but one should check PGR record. A very hard mud and little broken coral resulted. Never more than 10 degree wire angle. Chunks of bottom show minute strata. Black pebbles appear very altered. While handling Dredge 5, vessel drifted over bumps so another haul was made (6). We remained over bumps throughout this station as indicated by the PGR record.

CSP 4 commenced 2030 and lasted intermittently until 0908, 28 June. The brass hydrophone fish did not perform well and another 'phone was floated out on a cable. Details are in records. Record obtained by heaving to over, or just past, a bump and then drifting back over it. In this manner a record with very good signal-to-noise ratio could be obtained. We developed some films of earlier lowerings.

28 June Camera Station 6 commenced in same general area, over bumps. Used E. G. and G. compass on camera for first time and it was smashed when camera came aboard.

After this station, we steamed back to where CSP 4 ended and where Camera 6 commenced, to take Dredge 7. This resulted in a sample of massive coral fragments. Fines in sample were badly washed at rail before being brought aboard. Dredge 8 resulted in a sample of foraminiferal ooze, with a small fraction of broken branching coral.

CSP 5 commenced at 1807. An attempt to steam (260 rpm) was made with the brass AX-58 fish under a Braincon vehicle support float. Ship's noise was a factor until all the cable was paid out (about 800'), and then we were troubled by waves thumping the float. Various filter settings were used as per PGR record. We are presently producing CSP 6 after having steamed to southwest corner of area. The hydrophone in use is noisy so it will be replaced by AX-58 #348 as noted on PGR record. This will be a long profile from roughly the southwest corner to the northeast corner. Then our plan is to steam south and southwest to cover territory that we haven't seen on profiles.

29 June CSP 6 ended 0330. Prepare to get underway and at 0750 commenced CSP 7, which continued until 1140. With aid of sail, the vessel passed over some very nice bumps on both Profiles 6 and 7. We are presently steaming to some bumps encountered during CSP 7 for a camera lowering.

Camera Station 7 overboard at 1340. Started over bumps but drifted over flat; then, with the camera on the way up, we passed over some other bumps and so sent camera down again. Up finally at 1603 with busted Joy plug on pinger (SP-9, #11).

Dredges 9, 10, and 11 all taken with small Van Veen on flat area. All were predominately a calcareous sand. Lowerings monitored on PGR with Volkman pinger. At 2040 Camera Station 8 with color was commenced, but surfaced at 2300 not pinging or flashing. PGR showed it pinging on way up. Station largely over flat area because drift was to southwest, instead of the bumps hoped for to the northeast.

30 June A strong easterly is blowing so we will attempt south-to-north CSP over eastern side of Bump area. However, when starting position was reached (5 miles from end of Camera 8) there was no east wind. Continue to steam to a position which will take us southwest-northeast over Bump area and over ground not previously thumped. CSP 8 commenced 0230 and ended 0930, 1 July, during which very slow progress was made. We pulled in gear and will steam for northeast portion of area where CSP data were sparse.

At 1031 commenced CSP 9 (until 1330) passing bumps into gradually deepening water. A fine profile. Will take a look at Blake Escarpment by camera this PM since we're so close. Scientific crew so fired by various reports of cores, outcrops, and speculations that I cannot disappoint them.

Camera Station 9 at 1524-1730 on escarpment. Did not come up pinging or flashing, but someone saw it flash in water (later development showed camera was operating).

Dredge 12 at 1849 in about 760 fms. Bluish mud, pteropods and forams. While on escarpment. Thumper was turned on in over 800 fms., also at 680 fms. This comprised CSP 10. Bedding looks very regular downslope so did not spend more time as other work calls.

1 July Steamed until 0220 when we crossed spectacular fault-like feature of about 160 fms. throw. This is east of 77°30'W and is shown in one crossing between the two models made of the area. Followed this feature until it petered out; a few bumps seen also. This survey conducted by steaming west with E/S on and drifting back roughly northeast with Thumper, resulting in a broken record (CSP 11). At 0827 we hove to for camera lowering but drifted off feature before camera was made ready or Thumper gear retrieved. Therefore we steamed until 0920 for Camera Station 10, but wire had broken strand at 700 m. and this station lasted only an hour. This wire problem created some confusion and we drifted way off to the southeast. Broken wire was finally jettisoned.

Before 1200 we were back and then turned south for feature as seen at 0220. Arriving, we steam west and over it, heave to, and lower camera for Station 11. Unfortunately our drift did not carry us back over as we went northeast.

Dredges 13, 14, and 15 (Van Veens) were empty upon arrival at surface although their pinger was clearly tracked on E/S. This was probably due to a rather hard bottom. All on west side of scarp. Position determination complicated by ship's drills but all attempts were on west side.

Dredge 16 was an attempt to dredge a scarp but ship was unable to maintain westerly course against Gulf Stream with wire out. Sample (foram sand, coral debris) probably came from base of scarp. Vessel turned full circle two times in effort to get back on course to westward but with no success. We lost ground each turn. Dredge 17 was another attempt at dredging on scarp. About same sort of material resulted. On this station, the vessel was requested to steam 5-10 minutes beyond west side and heave to. Dredge was dropped and by this time we were back (east) over the edge. Then we steamed full speed with dredge partly down to west again,until over west edge. Then dredge was hauled back. Commence survey on N-S Feature of which a model has been built (see Figure V, VI).

2 July Continue N-S Feature survey by E/S to north and found minor feature to north and east (running parallel); thence back to where fault is well developed for Camera Station 12. On west side after the Camera Station, two dredge hauls were made. 18 took several good bites but small (1 qt.) sample resulted. Down again (19); pipe dredge showed much scour and mud streaks on outside, with some coral debris. On next station we shall use chain-bag dredge. Spent night surveying N-S Feature to south.

3 July On the 4-8 watch an east-west scarp (to east of N-S Feature) was found apparently running into N-S Feature. This juncture we are now investigating. Can't make much progress to southwest with this wind and current. Several CSP's conducted (12-19), one of which shows slumping (?) at foot of scarp. All day spent investigating nature of junction of these two systems. The west side of the N-S Feature is at a depth of about 360 fms. as is the south side of the east-west scarp. No camera station today, fairly rough. Have obtained several seismic profiles during attempts to cross corner where the two meet, but none exactly where I want them. The drift is rather strange so that there is no control over where we go while profiling. Took two dredges (20 and 21) on west side of scarp of N-S Feature. First not down long enough, but small sample of broken coral resulted. Second was 3/4 full of blocks of cemented calcareous sand, other larger tests, and some sponges. Very hard bottom, which may explain why Van Veens 13, 14,and 15 were empty.

4 July Continue E/S and thumping of east-west scarp, following it to the east. Attempt some film processing, but thumper converter running in darkroom makes it impossible to keep developer cool enough. During early hours both Lorans were giving consistent errors: looked as though they were reading first 10 and then 20 microseconds too high. Therefore there is doubt where we were but enough hangs

together (checked against bridge Loran) to say that this east-west scarp peters out as it approaches the Bump Province. Steam back to junction of N-S and east-west scarp systems and over west edge for Camera Lowering 13 at 1230. During station we drifted back over the scarp.

Dredge Station 22 was taken with care from a bump on the west side of the N-S Feature and consisted of broken coral and calcareous blocks. CSP 23 and 24 were obtained in the junction of the two systems. Difficult to get the drift to work for us. CSP 25, at 2352, continued until 0240, 5 July, and was at right angles to all others in junction area. Used jumbo.

5 July CSP 26 commenced at 0420 and 27 at 0715 (both with jumbo) and were parallel and southwest of CSP 25. Several times we have seen a feature of random structure (slump ?) at the base of the scarps on the CSP records. Camera Station 14 began at 1037 over the smaller, but parallel "fault," to the east of N-S Feature. Its western edge has a depth of 360 fms. as does the western edge of the N-S Feature. Attempt to dredge this scarp where Camera Station 14 was taken resulted in a lost dredge. It was quite a battle. Eventually the trip wire parted and we got back all trawl wire. Dynamometer jumped to maximum deflection and wire jumped off deck sheave and jammed. Much time required to restore things to normal. This was Dredge 23 and when first it hit bottom it lodged and never moved.

An E/S reconnaissance was taken to the west and south of the junction area to ascertain whether any faults continue further south or west. Apparently they do not. The east-west scarp was surveyed to the east. Earlier this had been done with inadequate navigation due to Loran problems. It was gradually lost among bumps.

CSP 28 started at 2147 and ran parallel to other profiles to the east. A nice profile over "fault" but still unable to take data with engine running in this depth.

6 July CSP 28 ended at 0102. Dredge 24 (Van Veen with pinger) lowered east of N-S Feature but apparently hit hard bottom and only a small sample resulted. Next a pipe dredge (25) was taken on the scarp parallel to N-S Feature which latter lies to the east of it. Dredge 26 taken further east and a sample of mud, calcareous stone, and coral debris resulted. CSP 29 accomplished with AX-58 (205) rigged about 12 ft. deep under Braincon float towed astern about 900 ft. At end of profile the brass 'phone fish was tried again but rigged differently. It was still too noisy. Therefore, it appears we can only profile under way at slow half. Against Gulf Stream and prevailing winds this means no gain over ground.

7 July CSP 30 ran from west of the N-S Feature area north to where CSP 11 was conducted. This ran from 0155-0650 with 'phone #205 12 ft. deep under Braincon float and about 900 ft. aft. Then steam to 32°N and commence CSP 31 (0852) steaming east along 32°N to Blake Escarpment. Course occasionally corrected by steaming slow half or letting off under bare poles in squalls. Profile continued until 2018 into 1100 fms. CSP 32 was run in an easterly direction parallel to and south of CSP 31 at 0264 in about 420 fms. The desired course was fouled up by a succession of heavy thunder and lightning squalls.

8 July CSP 32 continued until 1145 to about 1200 fms. Seas too rough for camera or dredge station. Steamed back northwest to area where CSP 11 was conducted. Will attempt sample if not too rough. Dredge Stations 27 and 28 attempted but no sample. A few pteropod spicules came up on tag line and the rusty dredge was well polished. Dredge bottom was improperly covered and I believe sample probably washed out.

CSP 33 taken in area of CSP 11 and 34, just to the north of them.

9 July At 0930 commence run to Charleston, S. C., with several Van Veen stations enroute to complete a line of samples commenced earlier on A-251 (1959). Scanty samples resulted on Dredge Stations 29-35. Perhaps bottom was too hard. PGR records seemed to indicate proper functioning as a pinger was used to monitor lowerings.

Drift bottles were thrown after passing 100 fm. curve.

10 July Passed sea buoy about 0715. Docked at 0900.

11 July George Keller of U. S. N. Hydrographic Office joined ship to observe operation of Thumper. A new 5000 w/s Thumper transducer was received for use on second leg of cruise. All previous CSP work done with 1000 w/s model.

12 July Leave Charleston 0945 and head for the E-W Feature area, just south of 31°N (see Figures V and VII). At 20 fms., we heaved to for first current measurement (see Figure II and Table I). Apparatus (lent by John Bruce) was on bottom over half hour. This station was followed by Dredge 36. Later, in 50 fms., Current Measurement 2 was taken. It appears that daylight may be necessary for these stations as the polypropylene line is black and very hard to see if floating. This station followed by Dredge 37. Dredge 38 taken in 210 fms., off shelf.

We would have liked to run a seismic profile from Charleston out to the "fault" area, but our best speed would be only fast half, and as we would be bucking the Stream, there would not be much progress over the ground (see Figures I, VII).

13 July Passed over E-W Feature about 0715 and Camera Station 15 was taken entirely on south side. Drift did not carry us back over scarp as anticipated. Current Measurement 3 was conducted on north side of scarp. Compass in current gear was mounted on BT wire instead of rope, as before, to enable it to be strung more tightly. The wire influenced readings so this lowering must be discounted as far as current direction data are concerned. Wire was replaced with rope after station. Dredge 39 was taken on north side at 1430. One black cobble resulted.

Camera Station 16 commenced on south side of scarp and during its progress the camera was drifted north over it. Steamed south while paying out hydro wire to get rid of kinks. Heaved to on north side for Dredge 40 which resulted in several types of sponges, calcareous rock, coral, and black cobbles.

Experimented with new 5000 w/s transducer which we find cannot be towed faster than slow half as plates remain apart. There is no shield to protect them. PGR paper speed is so slow (at the 5-second firing rate recommended) that paper dries, producing poor record. Commenced CSP 35 at 2137. Made several passes over "fault."

14 July CSP 35 ended at 0920. Camera Station 17 commenced at 1025. Current Measurement 4 in 400 fms. commenced at 1616; gear was on bottom at least 15 minutes. Apparatus is always capsized and dragged on bottom while being retrieved, or even before, if current is strong enough to cause the line to exert enough drag. CSP 36 at (2126) made several passes over fault-like features. Some very perplexing.

15 July CSP 36 ends at 1005. Camera Station 18 taken south of some complex features, but now drift carries us east rather than north, as in other stations. Sponges from Dredge 40 began smelling so bad that I had McGetchin do a description of them, preserve parts, and chuck the rest. There were no vessels large enough, or enough preservative, aboard to keep them. Banner day for sharks: crew caught and dispatched at least nine white-tipped. Sent Dredge 41 down in hollow after some maneuvering. MnO_2 coated (?) slabs and sponges resulted. Sent pipe dredge (42) down to collect fines, which turned out to be a calcareous sand.

The current measuring apparatus spent 15 minutes on the bottom during C. M. Station 5 in over 400 fms. of water. Attempted use of fish net floats on polypropylene line for visibility but they added drag and the gear was capsized on the bottom. Some were imploded. The gear was monitored by a pinger on the PGR which was arranged so that when the apparatus tipped over the pinger ceased pinging. CSP 37 commenced at 2240.

16 July A comparison was run between the 5000 w/s and 1000 w/s Thumpers over very nearly the same ground. CSP 37 ended at 0225 and was performed with the 5000 w/s transducer and AX-58 #205. CSP 38 was made with the 1000 w/s transducer from 0325 to 0655. Results: the high frequency trace (on PGR) of the 5000 w/s was very poor. The size of the transducer is such that it may influence such directional qualities as it has with respect to high frequencies, so that its orientation with respect to bottom would be critical. Another problem was that with a 5-second rep-rate (recommended by manufacturer) the paper speed on the PGR had to be very slow, in order to obtain a continuous record. This caused the paper to dry before the recording was made. In a more suitable climate this might not be a problem. The only programs possible with the PGR were as follows:

Sweep	Gate	Rep-rate
150 fm.	1:12	4.5 sec.
200	1:12	6
300	1:6	4.5
400	1:6	6

The records taken with the 5000 w/s thumper have a "condensed" look which is due to the slower paper speed. One must be careful to adjust the eye for this effect. For next profile we will remove Braincon float and replace with "elephant gut" floatation. Also, I will build a guard to enable 5000 w/s transducer plates to close after firing while being towed at a speed greater than slow half.

Camera Station 19 commenced at 1338; our drift was not as desired, but nevertheless camera passed over interesting topography. Current Measurement 6 at 1900 in over 400 fms. after boat drills. CSP 39 began at 2325 at eastern end of E-W "Fault" Province; however, bottom was virtually flat during profile.

17 July CSP 39 ended at 0930. The converter in the darkroom which powers Thumper is overheating and the Chief feels it will burn up its windings. It appears not prudent to take extremely long seismic profiles. CSP 39 was made with 200 fm. sweep at 1:6 gate thus thumping every three seconds, in spite of overheating. Watch periodically switched to center key to allow presentation of any possible deep penetration. After steaming west for good location, Camera Station 20 was begun at 1629. A good lowering as far as topographic features on PGR record were concerned. Glass port on flash unit flooded and was repaired. Current Measurement 7 (1824) was conducted on rough bottom. Rock Dredge 43 (2110) taken in nearly same area as Camera 20. Much calcareous rock. Will steam to westward generally to locate good topography for next CSP and camera lowering by E/S.

18 July Watch boxed in at least one depression into which Camera 21 was dropped at 1133. At 1420 Dredge 44 was dropped on north side of depression but bit deep and was tripped. Another attempt (45) was made in approximately the same location and resulted in large black slabs. Dredge 46 was dropped into depression in the following manner: dredge was lowered to 700-800 m. and then vessel drifted and steamed over depression. The dredge was then dropped to bottom. The haul resulted in a large black slab broken off with holdfasts on both surfaces, other slabs, calcareous rock, and sponges, notably a glass sponge.

CSP 40 was conducted over same area.

19 July Dredge Station 47 commenced at 1237. Current Measurement 8 was taken on south (?) edge of "fault" at 1500. Location on track chart detail (not in this report). At 1710 Dredge 48 was dropped at foot of north wall and was dragged up it. Dynamometer gave three tremendous jerks and dredge came back with two large black blocks, not apparently broken off. Pipe Dredge 49 was taken at base of scarp to obtain fines (calcareous ooze). CSP 41 commenced at 2104 with 1000 w/s Thumper in E. G. and G. fish suspended from boom. Good profile resulted, with multiples phased out.

20 July CSP 41 ended at 0830 and Camera Station 23 was taken where it ended. Passed over some interesting topography as vessel drifted north and east.

CSP 42 was located at end of CSP 38 where crossbedding or an unconformity had been noticed. Several passes were made over this feature (half a mile apart) until 1800 when we left area for a series of current measurements. Earlier measurements have indicated velocities as much as 0.4 kts. on the bottom.

21 July At 0053 in over 450 fms., in axis of Gulf Stream, Current Measurement 9 was made. Gear hung up on bottom and frame was badly racked, but nothing lost. After steaming further west, Current Measurement 10 (250 fms.) was completed without capsizing the gear. Camera Station 24 was made just inside 200 fm. curve with the expectation that drift would carry us back over. Hiatus in E/S records at end of C. M. 10 and Camera Station 24 occasioned by PGR blade drive failure. Dredge 50 (260 fms.) resulted in greenish-blue ooze and a small percentage of sub-sand-sized particles, some magnetic. Current Measurement 11 was taken in 88 fms. This station was taken to round out observations as our 50 fm. station (12 July), on leaving Charleston, was unsuccessful. CSP 43 commenced in about 120 fms. and ran perpendicular to contours (east) for a time; then sail was made and we headed north for a position off Cape Lookout where Gulf Stream leaves Plateau. This profile discontinuous because of PGR troubles.

22 July CSP 43 ran until 1431 and included some experiments with a special sparker cable using the Edgerton Thumper power supply (1100-1227). At 1445 we begin steaming to a location off Cape Lookout for current, camera, and dredge stations. After this work we will make detour out to deep water for CSP run in over 2000 fms. for G. Keller of Hydro.

23 July The current measurement planned for daylight was performed at 0435 due to an early arrival because of an assist by the Stream. The polypropylene line used on meter was fouled by our propeller and not cleared until 0710, after cutting and splicing the line to retrieve instruments. Dredge 51 in 380 fms. resulted in fine mud. Camera Station 25 commenced at 1012 in 350 fms. at a position from which drift was to carry us into deeper water, but did not. CSP 44 taken in 450-900 fms. with 5000 w/s transducer. A very nice profile, within limitations of the gear as described earlier. Dredge 52 in 1060 fms. resulted in mud similar to 51. We now steam to an area in 2200 fms. for test of 5000 w/s Thumper for G. Keller.

24 July Heaved to about 0050 in 1800 fms. to test gear for G. Keller and steamed east at slow half to deeper water. Maximum depth was 1920 fms.; we did not come upon depths as indicated on chart. Very poor results because of problems already discussed.

About 0400, head ship home. Track plot continued to latitude of Cape Hatteras, then Loran fixes every half hour while E/S.

25 July Steaming as before. Scientific crew busy dismantling gear, tabulating results, etc.

26 July Secure E/S watch at 0023 after passing Gay Head. Dock at 1100.

TABLE I

CURRENT METER STATIONS

Number	Date	Time	Lat. (N)	Long. (W)	Depth Fms.	Remarks
1	7/12	1622	32°10'	79°19'	25	Film developed-OK
2	7/12	1914	31°59'	79°15.5'	55	Camera ran betwee stations, no film fo lowering.
3	7/13	1300	30°53.5'	78°50.2'	430	Compass erroneous mounted on wire, replaced after lowering.
4	7/14	1616	30°56'	79°00'	443	On bottom about 15 min.
5	7/15	1935	30°59.5'	78°10.5'	450	On bottom at least 15 min. Pinger erratic.
6	7/16	1900	30°45.5'	77°53'	465	OK
7	7/17	1824	30°58.5'	78°13.5'	443	On rough bottom.
8	7/19	1500	30°55'	78°52.3'	435	Probably south of E-W Feature.
9	7/21	0053	31°24'	78°45'	270	In axis of Gulf Stream. Gear hung up on bottom and badly racked.
10	7/21	0810	31°47.5'	79°07'	285	West of main axis of Gulf Stream. Little surface current.
11	7/21	1420	31°43.2'	79°17'	88	Taken as replace-ment for #2.
12	7/23	0435	34°02'	75°48'	374	North edge of Blake Line caught in screw but gear eventually retrieved

TABLE II

EDGERTON CAMERA LOWERINGS

Number	Date	Time	Lat. (N)	Long. (W)	Remarks
Bump Province					
1	6/24	1703	31°50' 31°52'	77°23' 77°19'	Never reached bottom, second echo mix-up.
2	6/25	0830	31°48.7' 31°50'	77°29' 77°24'	Bottom flattened out during station.
3	6/25	2125	32°00' 32°00'	77°20' 77°17'	Camera over bumps. Light source flooded and replaced with LS-9, #15.
4	6/26	1130	31°52' 31°55'	77°30' 77°27'	Flash required adjustment to make operative.
5	6/27	0949	31°53.5' 31°55'	77°24.3' 77°22'	Very little drift, no steaming on wire. Data cards on Lowering #5 were not changed. They read #4 instead of #5.
6	6/28	1025	31°53' 31°50'	77°23.2' 77°19'	Camera over bumps. Compass used and smashed.
7	6/29	1340	31°46' 31°45'	77°23' 77°20.5'	Camera over bumps, drifted over flat, on way up drifted over more bumps so camera down again. Busted Joy plug on SP-9, #11, replaced by SP-8, #4, after lowering. F-4.5 lens set at f-11 as with the old camera.
8	6/29	2040	31°45' 31°45.5'	77°25' 77°24'	Station largely on flat area. Camera not pinging or flashing after lowering. Color.
9	6/30	1524	32°00.8' 32°00.8'	76°54' 76°50'	Escarpment in about 700 fms. Not pinging or flashing after lowering.
N-S Feature					
10	7/1	0920	32°08' 32°09'	77°35' 77°33'	Short run because of broken wire strand.

TABLE II (Continued)

Number	Date	Time	Lat. (N)	Long. (W)	Remarks
11	7/1	1411	32°03' 32°4.8'	77°37.5' 77°33'	Attempt photos of N-S Feature, but poor drift.
12	7/2	1445	32°01.5' 32°06'	77°33' 77°29'	Attempt photos of N-S Feature.
13	7/4	1223	31°50' 31°51'	77°37.5' 77°36'	At junction of N-S Feature and minor E-W Feature described in Narrative. Drift carried ship back over west edge of N-S Feature. Color.
14	7/5	1059	31°50' 31°51'	77°34' 77°36'	Camera down over smaller (parallel) feature east of N-S Feature.
E-W Feature					
15	7/13	0955	30°49' 30°52.5'	78°52' 78°50'	Entire station south of E-W Feature due to drift. With two old-type f-11 cameras.
16	7/13	1608	30°51.5' 30°55'	78°50' 78°48.5'	Station commenced south of E-W Feature and drifted north over it. Color.
17	7/14	1025	30°56.2' 30°53.8'	78°55.5' 78°53'	Attempt another drift across E-W Feature but failed.
18	7/15	1124	30°57' 30°56.5'	78°24' 78°19.2'	Commenced south of complex topography. Drift carries us elsewhere but still some topography. Color.
19	7/16	1338	30°51' 30°50.2'	78°08.2' 78°03.5'	Drifted over some topography, camera in depression. Light-source glass, cracked, replaced.
20	7/17	1629	30°58' 30°58.8'	78°17' 78°15.5'	Camera lowered over some topography. Flash unit flooded by not badly.

TABLE II (Continued)

Number	Date	Time	Lat. (N)	Long. (W)	Remarks
21	7/18	1133	30°58.5' 31°00'	78°31.5' 78°28.8'	Conducted over depression. Timer removed from pinger, Joy plug off camera.
22	7/19	0936	30°51' 30°53.5'	78°41' 78°38.2'	F-4.5 rigged obliquely, light source rigged vertically. One film labelled #21 and other labelled #22, but both dated 7/19.
23	7/20	0922	30°54.6' 30°53.8'	78°18.5' 78°13'	Commenced where CSP 41 ends, drifted to north and east. Passed over some topography. Oblique rig OK.
24	7/21	0959	31°50.2' 31°52.8'	79°13.5' 79°19.5'	Taken just inside 200 fm. curve with intent drift would carry us back over. Oblique rig. Color.
25	7/23	1012	34°03' 34°04.2'	75°50' 75°45'	Station in 350-600 fms., north edge of Blake.

TABLE III

DREDGE STATIONS

Sta. #	Date 1961	Time Down	Time Up	Lat. (N)	Long. (W)	Depth (fms.)	Type	Remarks
1	6/25	1235	1403	31°57'	77°26'	380	Chain Bag	Empty.
2	6/25	1407	1530	31°58'	77°18.5'	445	Chain Bag	Coral, black stone fragments.
3	6/26	1412	1449	31°56.5'	77°26'	400	Pipe	Carbonate mud, coral.
4	6/26	1638	1744	31°56'	77°26'	420	Pipe	Carbonate mud, coral sponges.
5	6/27	1402	1452	31°56.2'	77°15'	430	Pipe	Hard mud, coral, black cobbles.
6	6/27	1602	1702	31°55'	77°55'	390	Pipe	Hard green mud, coral.
7	6/28	1330	1430	31°53'	77°22.5'	410	Pipe	Branching and massive corals. Some fines lost at rail.
8	6/28	1502	1559	31°53'	77°21'	435	Pipe	Foraminiferal sand, coral fragments
9	6/29	1610	1642	31°46'	77°20'	470	Van Veen	Calcareous sand.
10	6/29	1703	1733	31°44'	77°20'	480	Van Veen	Calcareous sand.
11	6/29	1926	1956	31°48'	77°22'	434	Van Veen	Calcareous sand, fines, coral debris.
12	6/30	1849	2028	31°49'	76°49'	700	Pipe	Bluish mud, pteropods forams.
13	7/1	1904	1925	32°10'	77°32'	350	Van Veen	Empty.
14	7/1	1927	1955	32°09'	77°30'	350	Van Veen	Empty.
15	7/1	1959	2024	32°07'	77°32'	355	Van Veen	Empty.

TABLE III (Continued)

DREDGE STATIONS

Sta. #	Date 1961	Time Down	Time Up	Lat. (N)	Long. (W)	Depth (fms.)	Type	Remarks
16	7/1	2141	2252	31°51'	77°28'	362	Pipe	Foraminiferal sand, coral debris. Probably from base of scarp.
17	7/1 7/2	2353	0106	31°52'	77°28'	356	Pipe	Coral sand and debris.
18	7/2	2006	2050	32°00.5'	77°35'	360	Pipe	Coral debris, small black pebbles.
19	7/2	2058	2136	32°01'	77°34'	364	Pipe	Coral debris. Dredge scoured and some mud on outside.
20	7/3	2021	2113	31°49'	77°38'	368	Chain Bag	Coral sand and debris, one black fragment.
21	7/3	2125	2240	31°50.5'	77°37'	370	Chain Bag	Large blocks of cemented calcareous sand-sized particles, sponges.
22	7/4	1530	1629	31°49.5'	77°37'	375	Chain Bag	See #21.
3	7/5	1410	-	31°49'	77°36'	370	Chain Bag	Lost.
24	7/6	1052	1124	31°48'	77°34.5'	440	Van Veen	Coral and coral sand.
25	7/6	1219	1300	31°49'	77°34'	355	Pipe	Calcareous sand, coral debris.
26	7/6	1424	1520	31°49.5'	77°34.5'	460	Pipe	Green clay-mud, calcareous rocks, coral.
27	7/8	1907	2011	32°02'	77°30'	460	Pipe	Empty, polished dredge.

TABLE III (Continued)

DREDGE STATIONS

Sta. #	Date 1961	Time Down	Time Up	Lat. (N)	Long. (W)	Depth (fms.)	Type	Remarks
28	7/8	2012	2136	32°05'	77°28'	421	Pipe	Empty, polished dredge.
29	7/9	1210	1240	32°13'	77°43.5'	280	Van Veen	Empty.
30	7/9	1446	1509	32°16'	77°57'	275	Van Veen	Empty.
31	7/9	1707	1727	32°16.5'	78°08'	228	Van Veen	One black cobble
32	7/9	1730	1744	32°17'	78°09'	200	Van Veen	Calcareous sand, shell fragments, black pebble-sized rock.
33	7/9	2016	2050	32°22'	78°25.5'	150	Van Veen	Empty.
34	7/9	2034	2047	32°21.5'	78°24'	155	Van Veen	Large black rock with encrusting organisms.
35	7/9	2324	2341	32°22'	78°40.5'	188	Van Veen	Blue-gray mud.
36	7/12	1730	1732	32°12'	79°15'	25	Van Veen	Terriginous sand, shell debris.
37	7/12	2009	2015	32°00'	79°16'	53	Van Veen	Blue greenish-gray silt, fine sand.
38	7/12	2110	2122	31°55'	79°12'	123	Van Veen	See #37.
39	7/13	1430	1457	29°55.5'	78°50'	329	Van Veen	Small black rock.
40	7/13	1856	1959	30°53'	78°47'	445	Chain Bag	Platy and nodular black rocks, semi-consolidated calcareous material.
41	7/15	1650	1745	30°59'	78°14'	480	Chain Bag	See #40 plus sponges.
42	7/15	1809	1900	30°59'	78°13'	444	Pipe	Pteropod ooze.
43	7/17	2110	2215	30°57'	78°21'	508	Chain Bag	Calcareous sand.

TABLE III (Continued)

DREDGE STATIONS

Sta. #	Date 1961	Time Down	Time Up	Lat. (N)	Long. (W)	Depth (fms.)	Type	Remarks
44	7/18	1450	1529	31°00'	78°30'	450	Chain Bag	Empty, dredge tripped
45	7/18	1607	1701	30°58'	78°30'	443	Chain Bag	Black slabs, no nodules, sponges from flat rim of depression.
46	7/18	1828	1942	30°58.5'	78°30'	450	Chain Bag	Black slabs, semi-consolidated ooze. One slab broken off, holdfasts on both sides
47	7/19	1242	1334	30°55'	78°39'	448	Chain Bag	Semi-consolidated pteropod-foram ooze, one black slab.
48	7/19	1710	1806	30°52'	78°46'	473	Chain Bag	Two large black slabs.
49	7/19	1833	1937	30°54'	78°41'	450	Pipe	Pteropod-foram ooze, few small black slabs or nodules. Bottom of scarp.
50	7/21	1238	1309	31°52.5'	79°10'	260	Pipe	Greenish gray sandy ooze, large amount small black pebbles.
51	7/23	0855	0941	35°01.2'	75°50.5'	350	Pipe	Fine mud.
52	7/23	1357	1527	34°02'	75°40'	1060	Pipe	Fine blue-green mud.

TABLE IV

CONTINUOUS SEISMIC PROFILES

CSP	Date	Begin	End	Gear
1	6/26	0447	0727	Source: E. G. and G. 1000 w/s Thumper Transducer mounted on E. G. and G. fish. Fish suspended 6' under airplane wing tank filled with foam. Towed about 20' astern. Receiver: AX-58 hydrophone (#205) dangling 7' deep at end of 1000' cable, about 40' astern.
2	6/26	2115	2155	Source: See #1. Receiver: AX-58 (#64) rigged in brass fish towed at various speeds from 30' boom. Depth of 'phone indicated on record.
3	6/27	0334 0509	0450 0517	Source: See #1 except gear towed about 25' astern. Receiver: AX-58 (#205) 7' deep at end of 1000' cable. Source and receiver separated by about 30'.
4	6/27 6/28	2025 2300 0014 0124 0240 0400 0551 0728	2227 2339 0052 0149 0326 0443 0601 0908	Source: See #1. Receiver: AX-58 (#64) in brass fish at 8' depth about 15' ahead of wing tank, made fast to tank tow cable. With 1000' cable. Apparatus towed about 40' astern. Very noisy, so switched to AX-58 (#348) on another 1000' cable w/floats at 2135. Profiles by drifting.
5	6/28	1807	2040	Source: See #1. Receiver: AX-58 (#64) in brass fish under Braincon float on 1000' cable at varying distances astern.
6	6/28 6/29	2240	0326	Source: See #1. Receiver: See #5 but switched to AX-58 (#348) as noted on record.
7	6/29	0750	1138	Source: See #1. Receiver: See #6.
8	6/30	0230	0927	Source: See #1 except towed about 30' astern. Receiver: AX-58 (#205) on 500' cable w/floats, streamed only when thumping.
9	6/30	1031	1330	Source: See #1. Receiver: See #8.
10	6/30	2050 2120	2055 2140	Source: See #1. Receiver: See #8.

TABLE IV (Continued)

CONTINUOUS SEISMIC PROFILES

CSP	Date	Begin	End	Gear
11	7/1	0400 0540	0458 0614	Source: See #1, but fish on cargo boom instead of under wing tank. Receiver: AX-58 (#205).
12	7/2 7/3	2320	0010	Source: See #1. Receiver: AX-58 (#205), about 60' astern.
13	7/3	0130	0159	Source: See #1. Receiver: See #12.
14	7/3	0320	0345	Source: See #1. Receiver: See #12.
15	7/3	0520	0635	" " " " " "
16	7/3	1235	1445	" " " " " "
17	7/3	1500	1520	" " " " " "
18	7/3	1540	1746	" " " " " "
19	7/3 7/4	2351	0035	" " " " " "
20	7/4	0100	0210	" " " " " "
21	7/4	0246	0405	" " " " " "
22	7/4	0640	0800	" " " " " "
23	7/4	1825	2010	" " " " " "
24	7/4	2046	2250	" " " " " "
25	7/4 7/5	2352	0240	" " " " " "
26	7/5	0420	0620	" " " " " "
27	7/5	0715	0935	" " " " " "
28	7/5 7/6	2147	0102	" " " " " "

TABLE IV (Continued)

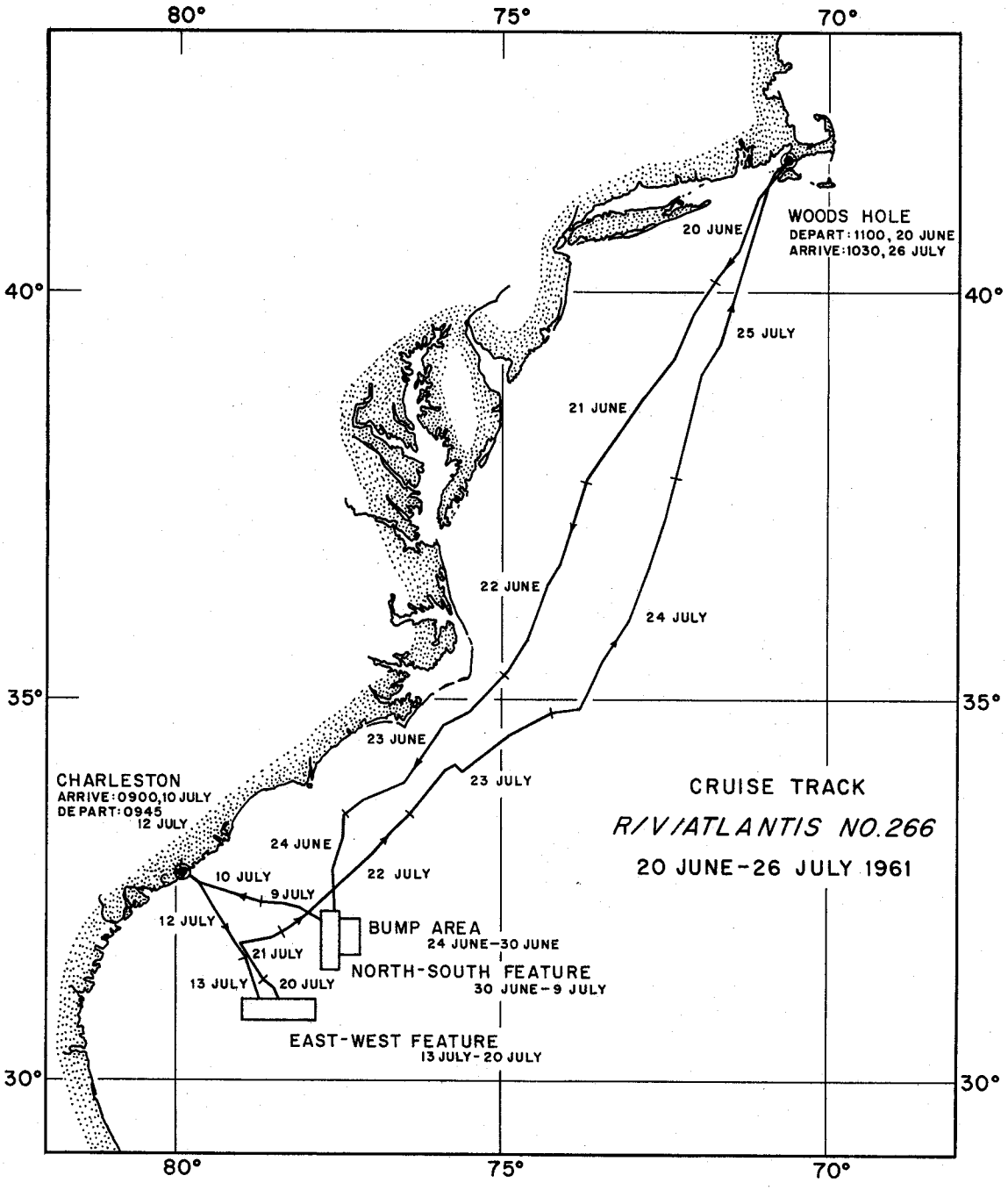
CONTINUOUS SEISMIC PROFILES

CSP	Date	Begin	End	Gear
29	7/6	1700 1900	1830 2046	Source: See #1. Receiver: AX-58 (#205) about 12' deep under Braincon float, towed astern about 900'.
30	7/7	0155	0650	Source: See #1. Receiver: AX-58 (#205) 12' deep under Braincon float and about 900' astern.
31	7/7	0852	2018	Source: See #1. Receiver: See #30.
32	7/8	0246	1145	Source: See #1. Receiver: See #30.
33	7/9	0115	0417	Source: See #1. Receiver: See #30.
34	7/9	0600	0910	Source: See #1. Receiver: See #30.
35	7/13 7/14	2137	0920	Source: E. G. and G. 5000 w/s Thumper on E. G. and G. fish suspended from boom. Receiver: AX-58 (#205) about 12' deep under Braincon float on 1000' cable. Distance astern varies, see recording.
36	7/14 7/15	2126	1005	Source and receiver: See #35.
37	7/15 7/16	2240	0230	Source and receiver: See #35.
38	7/16	0325	0655	Source: See #1, except suspended from boom. Receiver: See #35.
39	7/16 7/17	2325	0930	Source and receiver: See #35. Later Braincon float replaced by large "elephant gut" floatation - see record.
40	7/18	2129	2254	Source: See #35. Receiver: See #41.
41	7/19 7/20	2104	0833	Source: 1000 w/s in fish suspended from boom. Receiver: AX-58 (#205) on 1000' cable with floatation.
42	7/20	1239 1720	1659 1800	Source and receiver: See #41.

TABLE IV (Continued)

CONTINUOUS SEISMIC PROFILES

CSP	Date	Begin	End	Gear
43	7/21	1500	2130	Source: See #41. Exception was period 1100-1227 where 4 250' lengths of RG 8 A/U cables in parallel were used on both 1000 and 5000 w/s power supplies as a spark source. Receiver: See #41. Record discontinuous because of PGR troubles.
		2300	2305	
	7/22	2345	0404	
		0415	0455	
		0600	0610	
		0625	0700	
		0710	0730	
		0805	1053	
		1100	1227	
		1235	1241	
		1302	1431	
44	7/23	1244	1347	Source: See #35. Receiver: See #41.
45	7/24	0050	0345	Source: See #35. Receiver: See #41.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ARRIVE: 1030, 26 JULY
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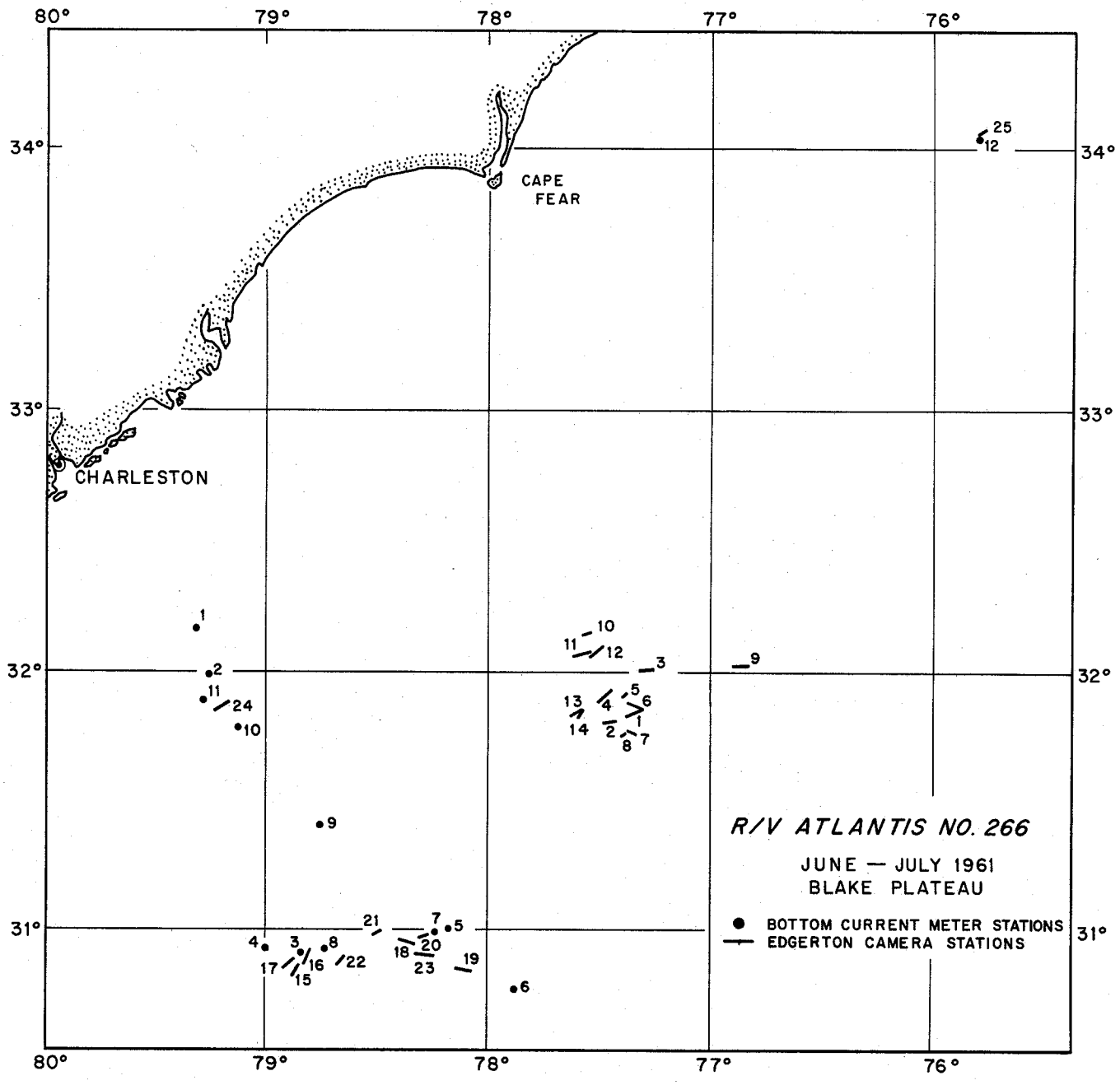
21 JUNE
22 JUNE
23 JUNE
24 JUNE
25 JULY
24 JULY
23 JULY
22 JULY
CHARLESTON
ARRIVE: 0900, 10 JULY
DEPART: 0945
12 JULY
10 JULY
9 JULY
12 JULY
21 JULY
13 JULY
20 JULY
BUMP AREA
24 JUNE–30 JUNE
NORTH-SOUTH FEATURE
30 JUNE–9 JULY
EAST-WEST FEATURE
13 JULY–20 JULY
CRUISE TRACK
R/V ATLANTIS NO. 266
20 JUNE–26 JULY 1961

FIGURE I.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CAPE
FEAR
CHARLESTON
R/V ATLANTIS NO. 266
JUNE — JULY 1961
BLAKE PLATEAU
BOTTOM CURRENT METER STATIONS
EDGERTON CAMERA STATIONS

FIGURE II.

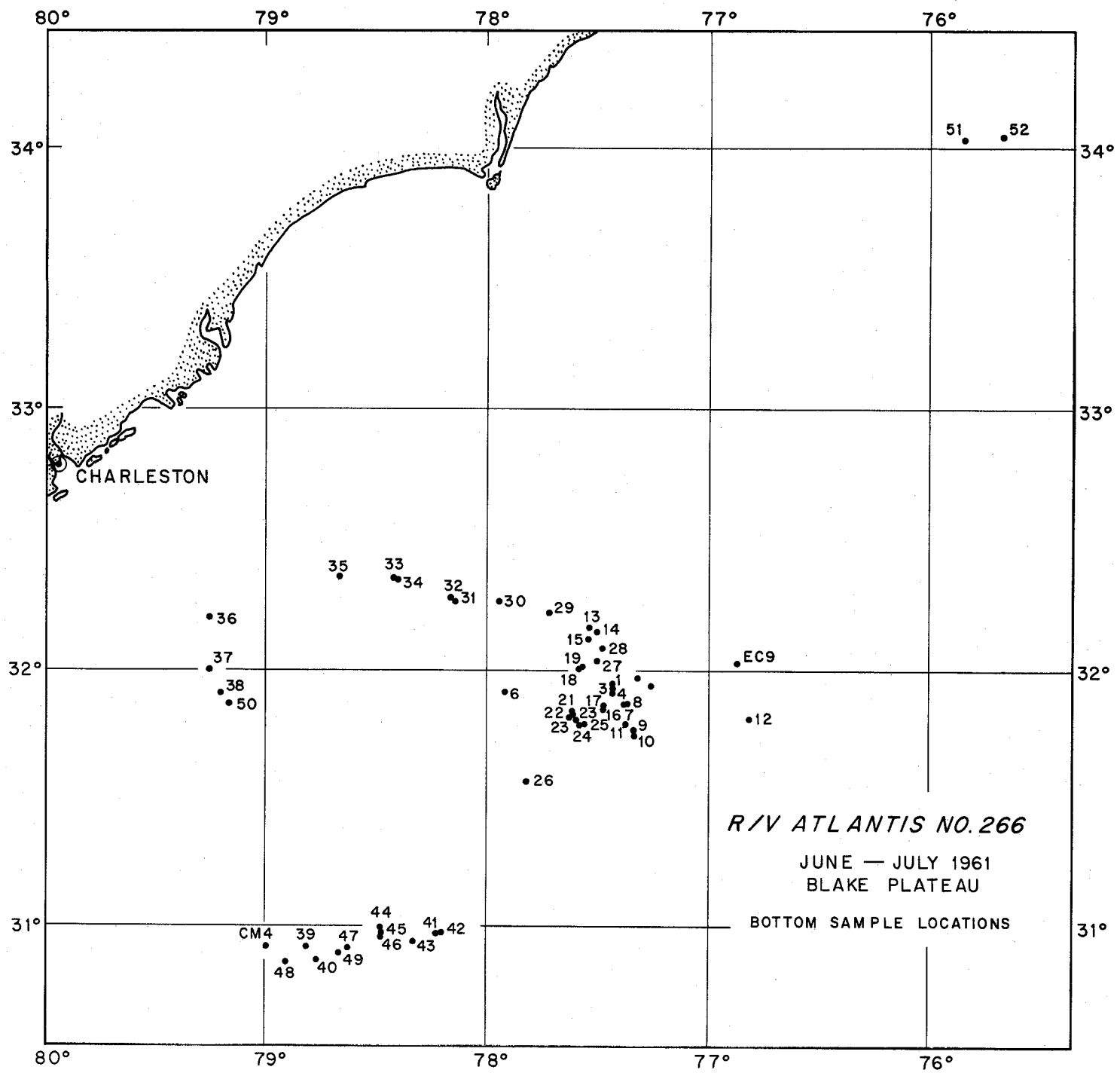
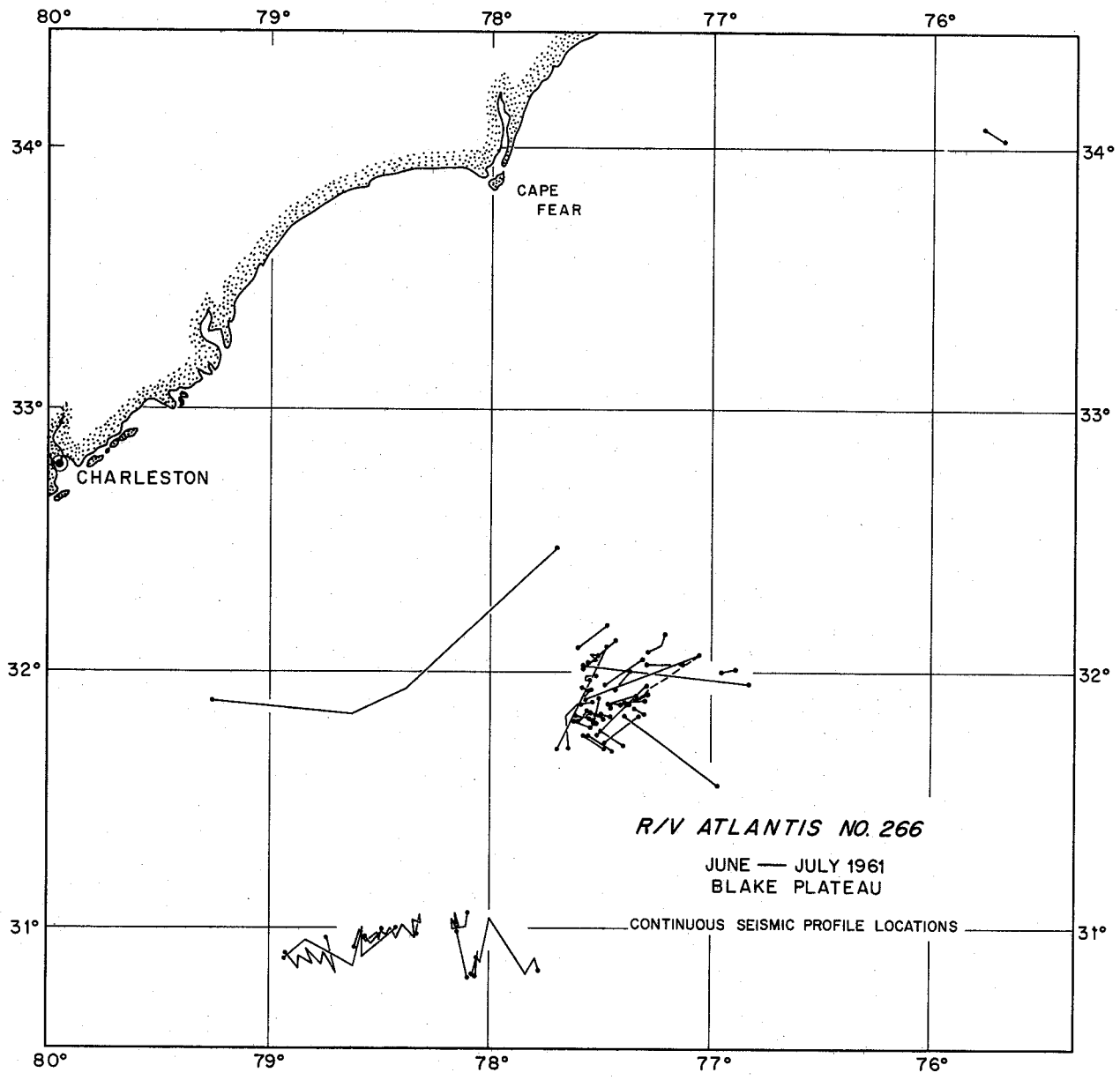

80°
79°
78°
77°
76°
34°
33°
32°
31°
CHARLESTON
R/V ATLANTIS NO. 266
JUNE — JULY 1961
BLAKE PLATEAU
BOTTOM SAMPLE LOCATIONS
EC9
CM4

FIGURE III.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CAPE
FEAR
CHARLESTON
R/V ATLANTIS NO. 266
JUNE — JULY 1961
BLAKE PLATEAU
CONTINUOUS SEISMIC PROFILE LOCATIONS

FIGURE IV.

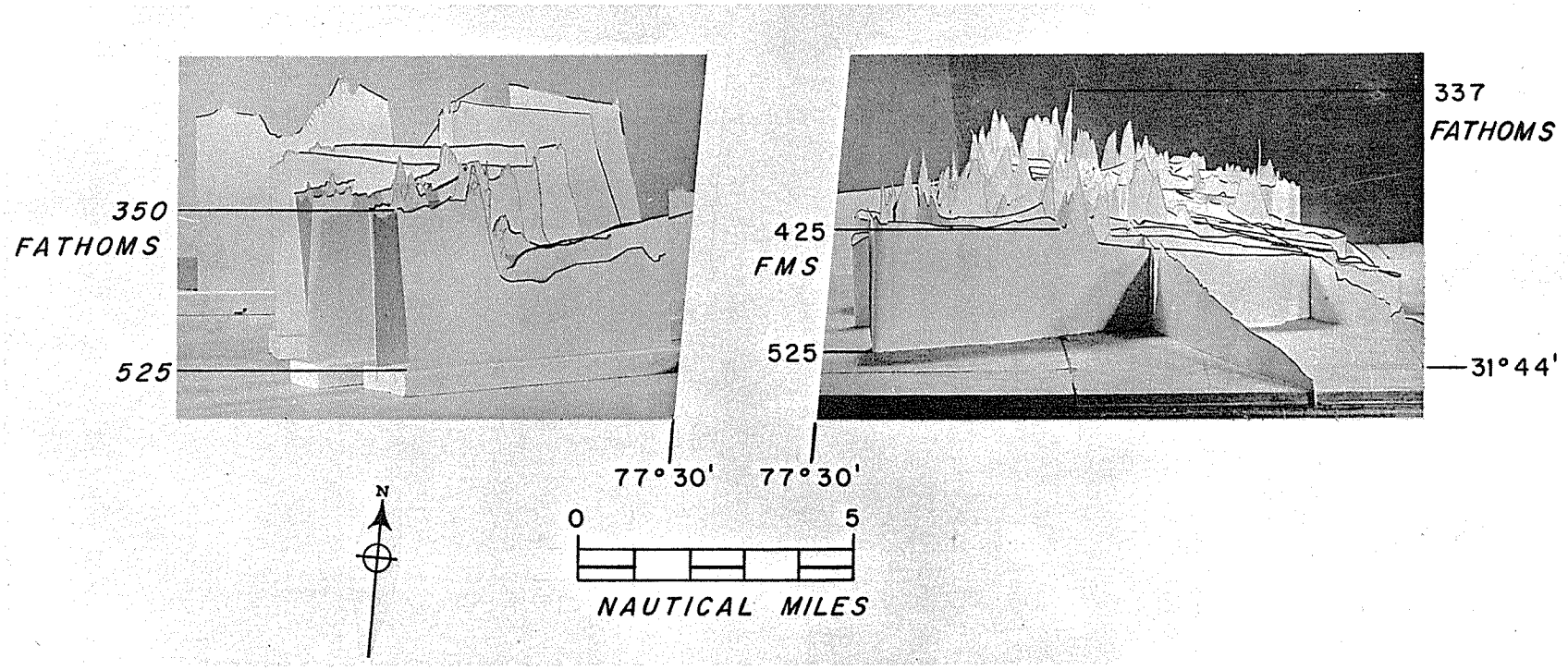

FIGURE V. A VIEW LOOKING NORTH OF THE NORTH-SOUTH FEATURE MODEL (LEFT) AND BUMP PROVINCE MODEL (RIGHT)

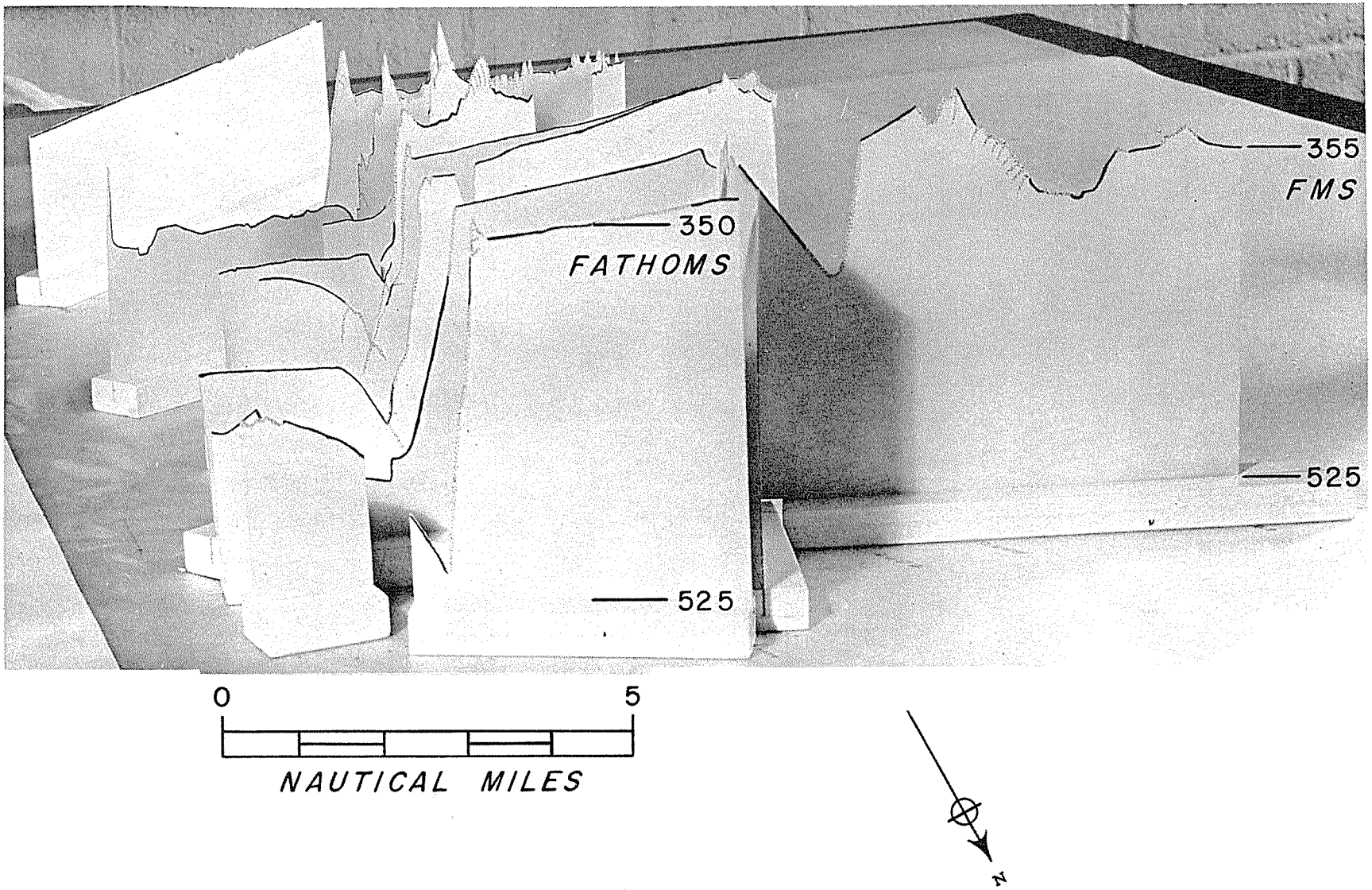

FIGURE VI. NORTH-SOUTH FEATURE MODEL LOOKING SOUTH

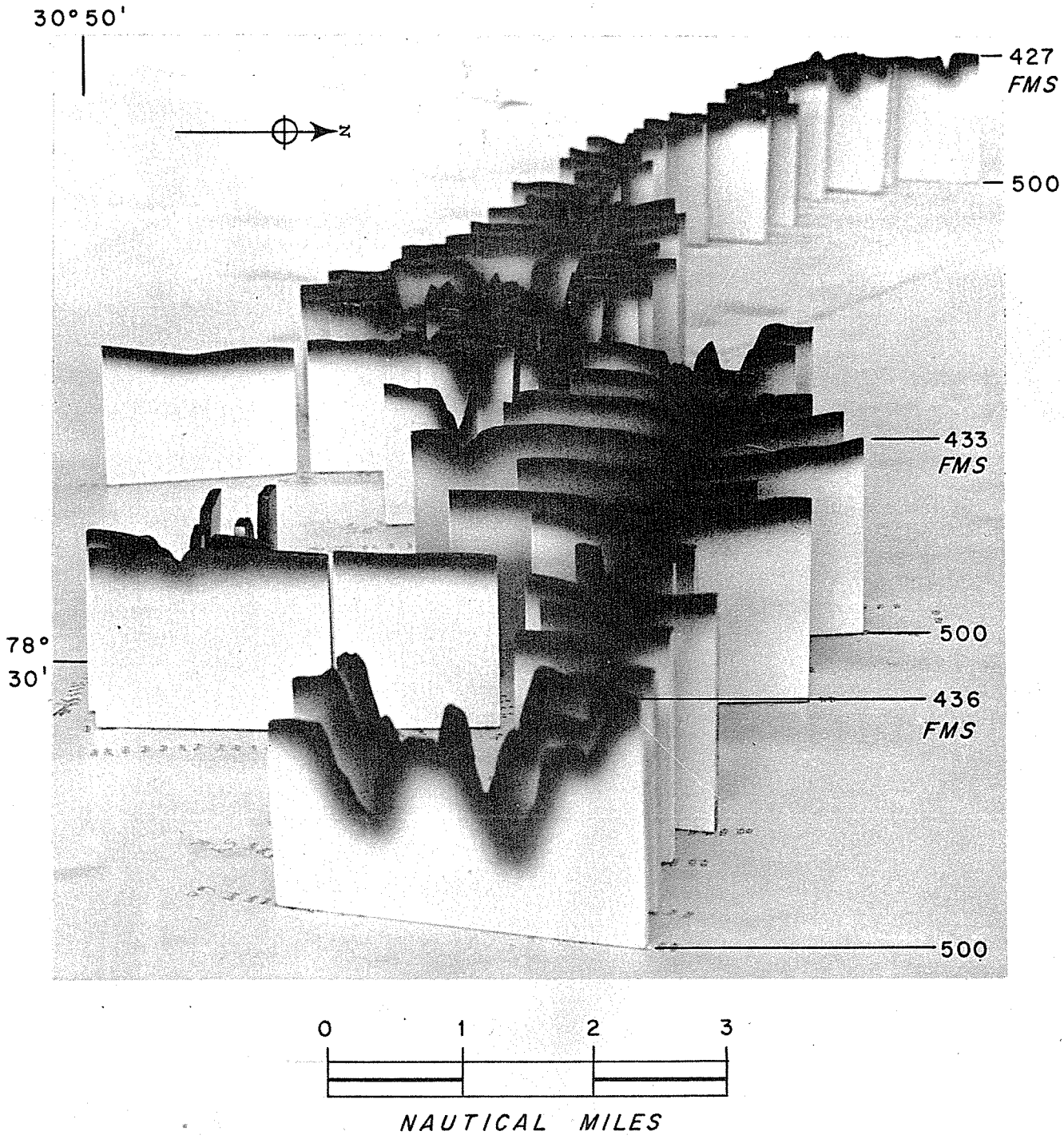

FIGURE VII. EAST-WEST FEATURE MODEL LOOKING WEST

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